AMENDMENTS TO THE CLAIMS:

The following listing of claims replaces all prior listings, and all prior versions, of claims in the application.

LISTING OF CLAIMS:

1-13. (Canceled).

14. (New) A method for determining reflection travel times of seismic events picked on 3D records of seismic data corresponding to signals picked up by seismic receivers distributed along an acquisition line in response to an emission in a subsoil of waves from source points, the seismic data having been previously converted to cylindrical wave data and interpreted, comprising:

a) defining a slowness vector $(\vec{p})$ whose component (p_x) in a direction parallel to the acquisition line defines a slope of the cylindrical wave;

b) for a seismic receiver situated at abscissa (X_R) on the acquisition line, seeking an abscissa (ξ) of at least one source point on the acquisition line such that rays starting from the seismic receiver at abscissa (X_R) and reflecting on a picked event emerges at the said at least one source point, with the slowness vector $(\vec{p})$ whose component in a direction of the acquisition line is $(-p_x)$;

c) determining a travel time $(t^e(X_R))$ for the said at least one source point by adding to a value of travel time along one of the said rays a time equal to a product of the slope of the cylindrical wave by the abscissa of the said at least one source point;

d) repeating steps b) and c) for all positions of the seismic receivers for which a demigration result is wanted; and

e) repeating steps a) to d) for all the values taken by parameter (p_x) for which an event has been picked in corresponding migrated data.

15. (New) A method for determining reflection travel times of seismic events picked on 3D records of seismic data corresponding to signals picked up by seismic receivers distributed along acquisition lines in response to an emission in a subsoil of waves from at least one source point, the data having been previously converted to a superposition of migrated cylindrical wave data and interpreted, comprising:

a) defining a slowness vector $(\vec{p})$ whose component (p_x) in a direction parallel to the acquisition lines defines a slope of the cylindrical waves associated with the various acquisition lines;

b) for a given seismic receiver situated at an abscissa (X_R) on an acquisition line, seeking an abscissa (ξ) of at least one source point on the acquisition line such that a ray starting from the seismic receiver and reflecting on a picked event emerges at said at least one source point, with the slowness vector $(\vec{p})$ whose component in the direction of the acquisition line is $(-p_x)$;

c) determining a travel time $(t^e(X_R))$ for the said at least one source point by adding to a value of travel time along said ray a time equal to a product of the slope of the cylindrical wave by an abscissa of the said at least one source point;

d) repeating steps b) and c) for all the positions of the receivers for which a demigration result is wanted; and

e) repeating steps a) to d) for all the acquisition lines for which a demigration result is wanted; and

f) repeating steps a) to e) for all the values taken by parameter (p_x) for which an event has been picked in the corresponding migrated data.

16. (New) A method as claimed in claim 14 where the travel times associated with the cylindrical wave events are used to implement a cylindrical wave reflection tomography technique and to calculate a velocity distribution in the environment.

17. (New) A method as claimed in claim 15 where the travel times associated with the cylindrical wave events are used to implement a cylindrical wave reflection tomography technique and to calculate a velocity distribution in the environment.

18. (New) A method as claimed in claim 14, where the travel times associated with the cylindrical wave events are converted to travel times associated with shotpoint events, by exploiting correspondences between the cylindrical wave data and shotpoint data.

19. (New) A method as claimed in claim 15, where the travel times associated with the cylindrical wave events are converted to travel times associated

with shotpoint events, by exploiting correspondences between the cylindrical wave data and shotpoint data.

20. (New) A method as claimed in claim 18, where the seismic data is organized by acquisition lines, shot travel times are converted to travel times associated with source-receiver pairs, conversion of travel time being carried out by extrapolation, in a direction of the acquisition lines, of travel time for the source-receiver pair that is closest to the source-receiver pair of an acquisition device for which information on the travel time is wanted.

21. (New) A method as claimed in claim 19, where the seismic data is organized by acquisition lines, shot travel times are converted to travel times associated with source-receiver pairs, conversion of travel time being carried out by extrapolation, in a direction of the acquisition lines, of travel time for the source-receiver pair that is closest to the source-receiver pair of an acquisition device for which information on the travel time is wanted.

22. (New) A method as claimed in claim 18, where the seismic data are constant-azimuth data, the shot travel times are converted to travel times associated with the source-receiver pairs, conversion of travel time being carried out by means of a double extrapolation, the first extrapolation being in the direction defined by an azimuth, the second extrapolation being in direction orthogonal to the direction defined by the azimuth.

23. (New) Application of the method as claimed in claim 18 for determining a velocity model by applying a reflection tomography to the travel times.

24. (New) Application of the method as claimed in claim 19 for determining a velocity model by applying a reflection tomography to the travel times.

25. (New) Application of the method as claimed in claim 20 for determining a velocity model by applying a reflection tomography to the travel times.

26. (New) Application of the method as claimed in claim 21 for determining a velocity model by applying a reflection tomography to the travel times.

27. (New) Application of the method as claimed in claim 22 for determining a velocity model by applying a reflection tomography to the travel times.